

ABSTRACT OF DISCLOSURE

A film bulk acoustic resonator (FBAR) includes a resistance layer deposited on the upper surface of a semiconductor substrate and having a recess therein, a membrane layer on the upper surfaces of the resistance layer and the recess, thereby forming an air gap between the membrane layer and the semiconductor substrate, and a resonator having a lower electrode, a piezoelectric layer, and an upper electrode deposited on the membrane layer. The resistance layer may include first and second resistance layers, the first resistance layer having the recess therein and the second resistance layer being deposited on the upper surfaces of the recess. Thus, the air gap is formed without etching the semiconductor substrate, enhancing the resonant characteristics of the FBAR. Active and/or passive devices can be formed underneath the air gap to be integrated with the FBAR.